-18-

REMARKS

The Examiner has allowed Claim 53, and indicated that Claim 11 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Applicant has amended Claim 11 in such manner. The Examiner is thanked for this allowance.

The Examiner further rejected Claims 22-52 under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. Specifically, the Examiner argues that page 68 of the specification, as originally filed, is not enabling with respect to the claimed "wherein the function is a function in which an initial n derivatives are tabulated and accessed via an interpolation operation." Applicant has again reviewed the specification, and respectfully disagrees with the Examiner's allegation. However, in the spirit of expediting the prosecution of the present application and rendering such issue moot, applicant has broadened the claims by removing such claimed subject matter.

The Examiner has further rejected Claims 1-10, 13-20, 54, and 55 under 35 U.S.C. 103(a) as being unpatentable over Read, U.S. Patent No.: 5,689,695, in view of Thayer et al., U.S. Patent No.: 6,298,438. The Examiner has further rejected Claims 22-24, 26, 27, and 30-33 under 35 U.S.C. 103(a) as being unpatentable over Read, U.S. Patent No.: 5,689,695, in view of Yue et al., U.S. Patent No.: 6,581,085.

Applicant respectfully disagrees with such rejections. Specifically, applicant has amended independent Claims 1, 13-15, 19-20, 22, and 31-33 to include the subject matter of Claims 54-55, and a narrower version of previously amended Claim 21.

With respect to the subject matter of Claims 54-55 (now resident in independent Claims 1, 13-15, 19-20, 22, and 31-33), the Examiner relies on the following excerpts from Thayer to make a prior art showing of applicant's claimed "wherein the swizzle operation is carried out utilizing commands selected from the group consisting of: .xyzw which means source(x,y,z,w) → input(x,y,z,w); .zzxy which means source(x,y,z,w) → input(z,z,x,y); and .xxxx which means source(x,y,z,w) → input(x,x,x,x)."

-19-

"To solve this problem, ORU 124 is devised, wherein ORU 124
"swizzles" bits within slots of vector registers as data moves
through the ORU. Swizzling or realigning the data allows the
operands to be shuffled as needed by the algorithm
concurrently with ALU 116 arithmetic operations. MEU 90 can
thereby load data slots, do a variety of operations between
data slot elements, and then store the final result without
involving numerous memory accesses. Load/store units are
therefore less likely to be overloaded, leaving free bandwidth
for the x86 integer ALU and integer registers to do basic
addressing, execute, and writeback operations." (col. 17,
lines 45-53)

"Vector operational instructions use a single opcode format
for simultaneously controlling ALU 116 and ORU 124; this
format is approximately 8 bytes long. Each instruction encodes
the two source registers, the destination register, the
partition size, and the operations to be performed on each
partition. In addition, each instruction encodes the ORU
routing settings for each of the eight slots." (col. 18, lines
38-44)

Such excerpts from Thayer and the remaining Thayer reference, however,
simply fail to even suggest a specific format of swizzle commands, as claimed by
applicant. Specifically, simply nowhere in Thayer is there even a suggestion of
swizzle commands for carrying out swizzling, such as .xyzw which means
source(x,y,z,w) → input(x,y,z,w); .zzxy which means source(x,y,z,w) →
input(z,z,x,y); and .xxxx which means source(x,y,z,w) → input(x,x,x,x). Only
applicant teaches and claims such a unique swizzle command format for facilitating
the programming of a graphics pipeline to perform swizzle operations in such
specific context.

Still yet, with respect to the subject matter of Claim 21 (which has been
narrowed and incorporated into Claims 1, 13-15, 19-22, and 31-33), the Examiner
has rejected the same under 35 U.S.C. 103(a) as being unpatentable over Read, U.S.
Patent No.: 5,689,695, in view of Brethour et al., U.S. Patent No.: 6,577,316, and
Chan et al., U.S. Patent No.: 6,163,837. Applicant respectfully disagrees with this
rejection of the subject matter of Claim 21, especially in its amended form present in
independent Claims 1, 13-15, 19-22, and 31-33.

Specifically, after careful review of each of such references, applicant notes
that simply nowhere in any of such references is there even a suggestion of at least
one or more of the following instruction set operations that provide particular

-20-

advantage in a graphics environment: a <u>call</u> operation, at least one of a <u>cosine</u> and a <u>sine</u> operation, a <u>fraction</u> operation, a <u>three component</u> dot product operation, a <u>four component</u> dot product operation, a distance <u>vector</u> operation, and a <u>light coefficients</u> operation (emphasis added).

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on applicant's disclosure. *In re Vaeck,* 947 F.2d 488, 20 USPQ2d 1438 (Fed.Cir.1991).

Applicant respectfully asserts that at least the third element of the *prima facie* case of obviousness has not been met, since the prior art references, when combined, fail to teach or suggest all the claim limitations, as noted above. For these reasons, independent Claims 1, 13-15, 19-22, and 31-33 (along with any claims depending therefrom) are deemed allowable.

With respect to the remaining rejected independent claims, the Examiner has further rejected Claims 34, and 37-52 under 35 U.S.C. 103(a) as being unpatentable over Read, U.S. Patent 5,689,695, in view of Duluk, et al., U.S. Patent 6,597,363, and Yue, et al., U.S. Patent 6,581,085. Applicant respectfully disagrees with such rejection, especially in view of the amendments made hereinabove.

Specifically, independent Claim 34, and 51-52 have been amended to incorporate the subject matter of either Claim 35 or 36. Note such limitations below:

"if the function includes a cosine function, adding a one (1) to the phase of the input data utilizing the computer graphics pipeline," and

-21-

"if the function includes at least one of a sine function and a cosine function, multiplying the input data by $(1/(2\pi) + 1)$ and performing a conditional 1's complement operation on the input data utilizing the computer graphics pipeline."

Applicant notes that the Examiner has not rejected such claims, nor has made any sufficient prior art showing. Further, applicant asserts that allowed Claim 52 is allowable, at least in part, by virtue of the inclusion of the foregoing subject matter of Claim 35 and 36.

For these reasons, Claims 34, and 51-52 (along with any claims depending therefrom) are deemed allowable.

Still yet, applicant brings to the Examiner's attention the following subject matter of added Claim 56 which is deemed allowable:

"wherein the swizzle operation is carried out utilizing commands including .x which means .xxxx, .y which means .yyyy, .z which means .zzzz, and .w which means .wwww, thus providing a short-cut notation."

An allowance or a specific showing in the prior art of these specific elements, in combination with the remaining claimed features, is respectfully requested.

All of the independent claims have thus been addressed and are deemed allowable for the reasons set forth hereinabove. By virtue of their dependence, any claims dependent therefrom are now deemed allowable.

For payment of the fees due in connection with the filing of this paper, the

-22-

Commissioner is authorized to charge such fees to Deposit Account No. 50-1351
(Order No. NVIDP055/P000369).

Respectfully submitted,
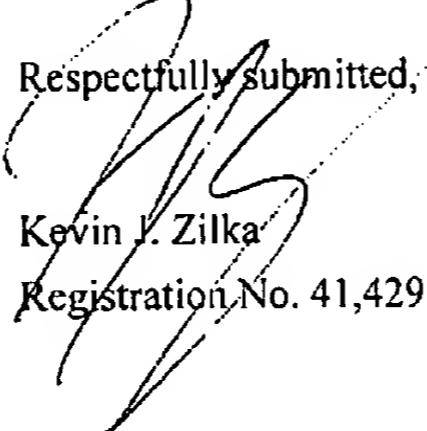
Kevin J. Zilka
Registration No. 41,429

P.O. Box 721120
San Jose, CA 95172-1120
Telephone: (408) 505-5100